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EXPRESS MAIL NO. EM035620340US

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TRANSMITTAL FORM

(To be used for all correspondence after initial filing)

Application Number	09/486,582
Filing Date	July 10, 2000
First Named Inventor	Sapna George
Art Unit	2615
Examiner Name	Andrew C. Flanders
Attorney Docket No.	851663.407

ENCLOSURES (*check all that apply*)

- [X] Fee Transmittal Form
  - [X] Fee Attached
- [ ] Amendment/Response
  - [ ] After Final
  - [ ] Affidavits/declaration(s)
- [ ] Extension of Time Request
- [ ] Express Abandonment Request
- [ ] Information Disclosure Statement and Transmittal
- [ ] Cited References
- [ ] Certified Copy of Priority Document(s)
- [ ] Response to Missing Parts under 37 CFR 1.52 or 1.53
- [ ] Response to Missing Parts/Incomplete Application
- [ ] Drawing(s)
- [ ] Request for Corrected Filing Receipt
- [ ] Licensing-related Papers
- [ ] Petition
- [ ] Petition to Convert to a Provisional Application
- [ ] Power of Attorney, Revocation, Change of Correspondence Address
- [ ] Declaration
- [ ] Statement under 37 CFR 3.73(b)
- [ ] Terminal Disclaimer
- [ ] Request for Refund
- [ ] CD, Number of CD(s) ______
  - [ ] Landscape Table on CD
- [ ] After Allowance Communication to TC
- [ ] Appeal Communication to Board of Appeals and Interferences
- [X] Appeal Communication to TC *(Appeal Notice, Brief, Reply Brief)*
- [ ] Proprietary Information
- [ ] Status Letter
- [X] Return Receipt Postcard
- [ ] Other Enclosure(s) (*please identify below*):

Remarks

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	Seed Intellectual Property Law Group PLLC	Customer Number 00500	
Signature	Timothy L. Boller		
Printed Name	Timothy L. Boller		
Date	September 6, 2007	Reg. No.	47,435

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OIPE SEP 0 6 2007 PATENT & TRADEMARK OFFICE

Fees pursuant to the Consolidated Appropriations Act. 2005 (H.R. 4818).

FEE TRANSMITTAL
For FY 2007

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT	($)500

Complete if Known	
Application Number	09/486,582
Filing Date	July 10, 2000
First Named Inventor	Sapna George
Examiner Name	Andrew C. Flanders
Art Unit	2615
Attorney Docket No.	851663.407

METHOD OF PAYMENT (check all that apply)

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FEE CALCULATION

1. BASIC FILING, SEARCH, AND EXAMINATION FEES

	FILING FEES		SEARCH FEES		EXAMINATION FEES		
		Small Entity		Small Entity		Small Entity	
Application Type	Fee ($)	Fee ($)	Fee ($)	Fee ($)	Fee ($)	Fee ($)	Fees Paid ($)
Utility	300	150	500	250	200	100	______
Design	200	100	100	50	130	65	______
Provisional	200	100	0	0	0	0	______

2. EXCESS CLAIM FEES

Fee Description	Fee ($)	Small Entity Fee ($)
Each claim over 20 (including Reissues)	50	25
Each independent claim over 3 (including Reissues)	200	100
Multiple dependent claims	360	180

Total Claims		Extra Claims		Fee ($)		Fee Paid ($)
______	-20 or HP =	______	X	______	=	______

HP = highest number of total claims paid for, if greater than 20.

Multiple Dependent Claims	
Fee ($)	Fee Paid ($)
______	______

Indep. Claims		Extra Claims		Fee ($)		Fee Paid ($)
______	-3 or HP =	______	X	______	=	______

HP = highest number of independent claims paid for, if greater than 3.

3. APPLICATION SIZE FEE

If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

Total Sheets		Extra Sheets		Number of each additional 50 or fraction thereof		Fee ($)	Fee Paid ($)
______	-100 =	______	/50 =	______ (round up to a whole number)	x	______	______

4. OTHER FEE(S)

	Fees Paid ($)
Non-English Specification, $130 fee (no small entity discount)	______
Other (e.g., late filing surcharge): Appeal Brief Fee	500
______	______
______	______

SUBMITTED BY

Signature	/Timothy L. Boller/ (signature)	Registration No. (Attorney/Agent)	47,435	Telephone	206-622-4900
Name (Print/Type)	Timothy L. Boller			Date	September 6, 2007

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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants	:	Sapna George et al.
Application No.	:	09/486,582
Filed	:	July 10, 2000
For	:	FAST SYNTHESIS SUB-BAND FILTERING METHOD FOR DIGITAL SIGNAL DECODING

Examiner	:	Andrew C. Flanders
Art Unit	:	2615
Docket No.	:	851663.407
Date	:	September 6, 2007

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPELLANTS' BRIEF

Commissioner for Patents:

This brief is in furtherance of the Notice of Appeal, filed in this case on July 6, 2007. The fees required under 37 C.F.R. Section 41.20(b)(2), and any required request for extension of time for filing this brief and fees therefore, are dealt with in the accompanying transmittal letter.

I. REAL PARTY IN INTEREST

The real party in interest is STMicroelectronics Asia Pacific (PTE) Limited, which is the assignee of the present invention. The assignment of record is to STMicroelectronics Asia Pacific PTE Limited, having an address at 28 Ang Mo Kio Industrial Park 2, Singapore, 569508 Singapore.

II. RELATED APPEALS AND INTERFERENCES

This application is a conversion of PCT Application No. PCT/SG97/00037 filed August 29, 1997, into a U.S. National Application. A previous appeal was filed June 20, 2006 after

which the Examiner reopened prosecution. Appellant is unaware of any decision being rendered or any docket number being assigned in the prior appeal in this case.

An appeal was filed regarding U.S. Application No. 09/622,736, and received by the Board on March 19, 2007 and assigned Appeal No. 2007-1735, which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in this appeal. Appellant is presently unaware of any decision being rendered in Appeal No. 2007-1735.

III. STATUS OF CLAIMS

Claims 1-20 are currently pending in this application. All pending active claims are attached hereto as Appendix A.

Claims 1-20 were rejected under 35 U.S.C. § 101 as being directed to non-statutory subject matter.

Claims 1-6, 11, 18 and 19 were rejected under 35 U.S.C. § 103(a) as being unpatentable over *Uramoto* (European Patent Application 0 506 111 A2).

Claims 7-10, 12-17 and 20 were rejected under 35 U.S.C. § 103(a) as being unpatentable over *Uramoto* in view of *ISO Standard 11172-3*.

The rejection of claims 1-20 is appealed.

IV. STATUS OF AMENDMENTS

A response to the final rejection was mailed on May 8, 2007. No amendments were requested. On May 24, 2007, the Examiner issued an Advisory Action disagreeing with the response to the final rejection.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The following summary discusses the subject matter of the independent appealed claims along with references to portions of the specification and drawings that provide support for the claims. The references are provided for exemplary purposes and are not intended to restrict the scope of the claims to the particular embodiments corresponding to the references provided.

Embodiments of the invention are directed to enhanced synthesis sub-band filtering during decoding of digital audio signals. Embodiments decode, for example, MPEG 1

layer 2 encoded audio. An Inverse Modified Discrete Cosine Transform (IMDCT) is implemented using addition/subtraction followed by multiplication.

Specifically, independent claim 1 is directed to a method of decoding digital audio data comprising the steps of obtaining an input sequence of data elements representing encoded audio samples, preprocessing the input sequence of data elements to produce an array of sum data and an array of difference data using selected data elements from the input sequence, producing a first sequence of output values using the array of sum data, producing a second sequence of output values using the array of difference data and forming decoded audio signals from the first and second sequences of output values. Specification references are to the published PCT application. Support for independent claim 1 can be found in the last paragraph on page 2. More detail in the form of examples is provided on pages 2-12 and Figures 3-5.

Independent claim 8 is directed to a method of decoding a sequence of m, m an even positive integer, input digital audio data samples S[k], where k = 0, 1, ... (m-1), to produce a set of n, n an even positive integer, output audio data samples V[i], where i = 0, 1, ...(n-1), comprising the steps of:

a) producing an array of sum data $S_{ADD}[k]$ according to

$$S_{ADD}[k] = S[k] + S[m-1-k] \qquad \text{for } k = 0, 1, \ldots(m/2-1)$$

b) producing an array of difference data $S_{SUB}[k]$ according to

$$S_{SUB}[k] = S[k] - S(m-1-k) \qquad \text{for } k = 0, 1, \ldots(m/2-1)$$

c) producing a first output audio data sample by a multiply-accumulate operation according to

$$V[2i] = V[2i] + N[i, k]*S_{ADD}[k] \qquad \text{for } k = 0, 1, \ldots (m/2-1)$$

$$\text{where } N[i, k] = \cos\left[\frac{(32+2i)(2k+1)\pi}{64}\right]$$

d) producing a second output audio data sample by a multiply-accumulate operation according to

$$V[2i+1] = V[2i+1] + N[i, k]*S_{SUB}[k] \qquad \text{for } k = 0, 1, \ldots (m/2-1)$$

$$\text{Where } N[1, k] = \cos\left[\frac{(32+(2i+1))(2k+1)\pi}{64}\right]$$

e) and repeating steps c) and d) for i = 0, 1, ... (n/2-1) to obtain a full set of output data.

Support for claim 8 can be found in the last paragraph beginning on page 3 and continuing to page 4.

Independent claims 11 and 14 include means-plus-function elements. According to 37 CFR 41.37(c)(1)(v), such means-plus-function elements "must be identified and the structure, material, or acts described in the specification as corresponding to each claimed function must be set forth with reference to the specification by page and line number, and to the drawing, if any, by reference characters." Accordingly, the following shows claims 11 and 14 together with the required information in parentheses.

11. A synthesis sub-band filter for use in decoding digital audio data, comprising:

means for receiving or retrieving an input sequence of data elements comprising encoded digital audio data; **(Page 4, first full paragraph; Fig. 2, input to audio decoder circuit 20 and the description thereof on page 5, first full paragraph; Figure 3, step 44; Figure 4, step 84; Figure 5, step 104)**

pre-processing means for producing an array of sum data and an array of difference data using selected data elements from the input sequence; **(Page 4, first full paragraph; Figure 2, audio decoder circuit 20 and the description thereof on page 5; Figure 3, step 52; Figure 4, step 86; Figure 5, steps 106, 108, 110)** and

transform output means for producing a first sequence of decoded output values using said array of sum data and a second sequence of decoded output values using said array of difference data. **(Page 4, first full paragraph; Figure 2, audio decoder circuit 20 and the description thereof on page 5; Figure 3, step 52; Figure 4, steps 88, 90, 92; Figure 5, steps 112, 114, 116, 118, 120, 122).**

14. An MPEG decoder comprising:

means for receiving an input sequence of data elements comprising encoded digital audio data; **(Page 4, first full paragraph; Fig. 2, input to audio decoder circuit 20 and**

the description thereof on page 5, first full paragraph; Figure 3, step 44; Figure 4, step 84; Figure 5, step 104)

means for producing an array of sum data and an array of difference data using selected data elements from the input sequence; and **(Page 4, first full paragraph; Figure 2, audio decoder circuit 20 and the description thereof on page 5; Figure 3, step 52; Figure 4, step 86; Figure 5, steps 106, 108, 110)** and

means for producing a first sequence of decoded output values using said array of sum data and a second sequence of decoded output values using said array of difference data. **(Page 4, first full paragraph; Figure 2, audio decoder circuit 20 and the description thereof on page 5; Figure 3, step 52; Figure 4, steps 88, 90, 92; Figure 5, steps 112, 114, 116, 118, 120, 122).**

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

1. Whether claims 1- 20 are directed to non-statutory subject matter.
2. Whether claims 1-6, 11, 18 and 19 are unpatentable over *Uramoto* (European Patent Application 0 506 111 A2).
3. Whether claims 7-10, 12-17 and 20 are unpatentable over *Uramoto* in view of *ISO Standard 11172-3*.

VII. ARGUMENT

The Examiner initially bears the burden of establishing a *prima facie* case of unpatentability. *Hyatt v. Dudas*, 492 F.3d 1365, 1369-70 (Fed. Cir. 2007). For the reasons set forth below, the Examiner has failed to meet this burden.

A. Claims 1-20 Are Directed to Statutory Subject Matter

1. Claims 1-7, 18 and 19 Are Directed to Statutory Subject Matter.

Claim 1 recites, in part:

A method of decoding digital audio data, comprising the steps of:

obtaining an input sequence of data elements representing encoded audio samples;

preprocessing the input sequence ... to produce an array of sum data and an array of difference data ...;

producing a first sequence of output values using the array of sum data;

producing a second sequence of output values using the array of difference data; and

forming decoded audio signals from the first and second sequences of output values.

The Examiner argues that claim 1 is a method claim failing into the statutory process category. The Examiner then contends that the claim fails into the judicial exception of a mathematical algorithm and that no transformation or practical application that produces a tangible, physical result is involved because "[d]igital audio data is not physical, rather a form of energy representing data. Manipulating this energy does not involve a physical transformation." *See* Final Office Action at 2. The Examiner's position has been flatly rejected by the Federal Circuit. *See, e.g., Arrhythmia Research Technology v. Corazonix Corp.*, 958 F.2d 1053, 1059 (Fed. Cir. 1992) ("The view that there is 'nothing necessarily physical about "signals"' is incorrect"). Thus, the recited steps of "producing a first sequence of output values," "producing a second sequence of output values," and "forming decoded audio signals from the first and second sequences of output values" are steps that cause a physical transformation.

The Examiner further contends that "forming decoded audio signals from two sequences of values ... is not a useful, tangible and concrete result, but rather the result of a process." Final Office Action at 2-3. The Examiner's reasoning is incorrect. "It is now commonplace that an application of a law of nature or mathematical formula to a known structure or process may well be deserving of patent protection." *Diamond v. Diehr*, 450 U.S. 175, 187-88 (1981). To determine if a claim is directed towards a practical application of an abstract idea, the claim must be considered as a whole. *Diehr*, 450 U.S. at 188. A claimed process is statutory if the process claim results in a physical transformation with a practical application, or otherwise produces a useful, tangible, and concrete result. *See Id.* at 183-83, 192-93.

Claim 1 satisfies the test set forth in *Diehr*. Claim 1 recites a process that results in a physical transformation of data elements representing encoded audio samples into decoded

audio signals. Further, the result of the process is decoded audio signal, which is a useful, tangible and concrete result because a decoded audio signal is a physical result. Decoding an audio signal is useful because encoding and decoding increase the speed of transmission and decrease the amount of storage required. Decoding an audio signal produces a tangible, real-world result. Audio signals, reconstructed in real time are utilized in many devices like radios, televisions, telephones, and computers. Forming decoded audio signals produces signals that can be utilized by a listener. Further, the process of claim 1 is substantially repeatable and will consistently return substantially the same result. Therefore, contrary to the Examiner's assertion, the recited method of decoding digital audio data produces a useful, tangible, and concrete result. Thus, the Examiner has failed to establish a prima facie case that claim 1 is not directed to statutory subject matter. Claims 2-7, 18 and 19 depend from claim 1. Accordingly, claims 1-7, 18 and 19 are directed to statutory subject matter.

2. Claims 8-10 and 20 Are Directed to Statutory Subject Matter

Independent claim 8 recites, "[a] method of decoding a sequence of … input digital audio data samples … to produce a set of … output audio data samples … comprising the steps of: … producing an array of sum data … producing an array of difference data …producing a first output audio data sample … producing a second output audio data sample." The Examiner applies the same reasoning to claim 8 as the Examiner applied to claim 1. Claim 8 also satisfies the test set forth in *Diehr*. Claim 8 recites a process that results in a physical transformation of input digital audio data samples into output audio data samples. Claim 8 does not recite "data" in the abstract, but recites audio data samples. Further, the result of the process is a full set of decoded audio data samples, which is a useful, tangible and concrete result for reasons set forth above. Claims 9, 10 and 20 depend from claim 8. Accordingly, claims 8-10 and 20 are directed to statutory subject matter.

3. Claims 11-13 Are Directed to Allowable Subject Matter

Independent claim 11 recites:

A synthesis sub-band filter for use in decoding digital audio data, comprising:

means for receiving or retrieving an input sequence of data elements comprising encoded digital audio data;

pre-processing means for producing an array of sum data and an array of difference data using selected data elements from the input sequence; and

transform output means for producing a first sequence of decoded output values using said array of sum data and a second sequence of decoded output values using said array of difference data.

Claim 11 is a product claim in means-plus-function format. The Examiner's primary argument is that a digital signal processor configured to perform the recited functions (for example, by executing software instructions) is not statutory. This is not relevant to whether claim 11 is directed to statutory subject matter. A digital signal processor may be configured to cause a physical transformation that produces a useful, tangible, and concrete result, and there are many patent applications for digital signal processors that are so configured. *See Arrhythmia*, 958 F.2d at 1060 ("The use of mathematical formulae or relationships to describe the electronic structure and operation of an apparatus does not make it non-statutory.") Moreover, specific software and hardware combinations are described in the specification for performing the recited functions. The recited means are configured to perform specific functions that cause a physical transformation ("an input sequence of data elements comprising encoded digital audio data" is transformed into "a first sequence of decoded output values" and a "second sequence of decoded output values") and are configured to produce a useable, tangible and concrete result (a synthesis sub-band filter). Further, claim 11 is directed to a specific apparatus of practical utility (a synthesis sub-band filter) and specified application (decoding digital audio data). Claims 12 and 13 depend from claim 11. Accordingly, claims 11-13 are directed to statutory subject matter.

4. Claims 14-17 Are Directed to Allowable Subject Matter

Independent claim 14 recites,

An MPEG decoder comprising:

means for receiving an input sequence of data elements comprising encoded digital audio data;

means for producing an array of sum data and an array of difference data using selected data elements from the input sequence; and

means for producing a first sequence of decoded output values using said array of sum data and a second sequence of decoded output values using said array of difference data.

Claim 14 recites a product claim for an MPEG decoder in a means-plus-function format. The Examiner relies on the same argument used to reject claim 11. The recited means of claim 14 are configured to perform specific functions that cause a physical transformation ("an input sequence of data elements comprising encoded digital audio data" is transformed into "a first sequence of decoded output values" and a "second sequence of decoded output values") and are configured to produce a useable, tangible and concrete result (an MPEG decoder). Further claim 14 is directed to a specific apparatus of practical utility (an MPEG decoder) and specified application (producing sequences of decoded output values). Claims 15-17 depend from claim 14. Accordingly, claims 14-17 are directed to statutory subject matter.

B. The Examiner Has Failed to Establish a Prima Facie Case of Obviousness

The Examiner initially bears the burden of establishing a *prima facie* case of obviousness. *In re Bell*, 26 U.S.P.Q.2d 1529 (Fed. Cir. 1993); *In re Oetiker*, 977 F.2d 1443, 1445, 24 U.S.P.Q.2d 1443, 1444 (Fed. Cir. 1992); *In re Piasecki*, 745 F.2d 1468, 1472, 223 U.S.P.Q. 785, 788 (Fed. Cir. 1984); MPEP § 2142. An Applicant may attack an obviousness rejection by showing that the Examiner has failed to properly establish a *prima facie* case or by presenting evidence tending to support a conclusion of non-obviousness. *In re Fritch*, 972 F.2d at 1265.

In order for an examiner to establish a *prima facie* case that an invention, as defined by a claim at issue, is obvious the examiner must: (1) show some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine the reference teachings; (2) there must be a reasonable expectation of success; and (3) the prior art reference (or the combined references) must teach or suggest all the claim limitations. *See In re Thrift and Hemphill*, 298 F.3d 1357, 1366 (Fed. Cir. 2002); MPEP § 2142. The recent U.S. Supreme Court case, *KSR Int'l*

Co. v. Teleflex, Inc., does not change the requirement for an examiner to provide such evidence of motivation. 127 U.S. 1727, 1740-41 (2007). "The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure." MPEP § 2143. The level of skill in the art cannot be relied upon to provide the suggestion to combine the references. MPEP § 2143.01 (citing *Al-Site Corp. v. VSI Int'l Inc.*, 174 F.3d 1308, 50 U.S.P.Q.2d 1161 (Fed. Cir. 1999). The mere fact that the references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. MPEP § 2143.01 (citing *In re Mills*, 916 F.2d 680, 16 U.S.P.Q. 2d 1430 (Fed. Cir. 1990).

Moreover, a reference must be viewed as a whole, including portions that would lead away from the claimed invention. MPEP § 2141.03 (citing *W.L. Gore & Assoc., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 U.S.P.Q. 303 (Fed. Cir. 1983). If the proposed modification would change the principles of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. MPEP § 2143.01 (citing *In re Ratti*, 270 F.2d 810, 123 U.S.P.Q. 349 (CCPA 1959)).

1. Claims 1-6, 11, 18, and 19 are not obvious over Uramoto

The Examiner rejected claims 1-6, 11, 18 and 19 under 35 U.S.C. § 103(a) as being unpatentable over Uramoto (European Patent Application No. 0 506 111 A2). The Examiner has failed to establish a *prima facie* case of obviousness. Specifically, the Examiner has failed to show that Uramoto teaches, suggests or motivates the claimed invention. Moreover, Uramoto teaches away from the claimed invention.

The Examiner argues that Uramoto teaches decoding of digital video data, and that it would have been obvious to apply the teachings of Uramoto to digital audio data. This argument assumes that Uramoto teaches, suggests or motivates each of the recited elements for the decoding of digital video data. This assumption, however, is incorrect, as explained below.

Turning to the language of the claims, claim 1 recites, in part "[a] method of **decoding** digital audio data, comprising the steps of: obtaining **an input sequence of data elements representing encoded audio samples**; preprocessing **the input sequence of data elements** to produce an array of sum data and an array of difference data **using selected data**

elements from the input sequence …" (emphasis added). Similarly, claim 11 recites, in part, "[a] synthesis sub-band filter for use in **decoding** digital audio data, comprising: means for receiving or retrieving **an input sequence of data elements comprising encoded digital audio data**; pre-processing means for producing an array of sum data and an array of difference data **using selected data elements from the input sequence** …" (emphasis added).

The portions of Uramoto to which the Examiner points do not teach or suggest a method of decoding digital audio data, as recited. To the extent decoding is addressed, a different method is taught. The portion of Uramoto to which the Examiner points, including the discussion of digital video encoding on page 2, teaches using the discrete cosine transform (DCT) for **encoding**. See Figure 5 of Uramoto and the accompanying description thereof on page 8, lines 15-37. Uramoto teaches using the inverse discrete cosine transform (IDCT) for decoding, which teaches post-processing "a sum and a difference between intermediate data." In other words, intermediate multiplication of the input occurs and it is the intermediate data that is subjected to additions and subtractions. See, *e.g.*, the description of Figure 11 of Uramoto and the accompanying description thereof on page 10, line 48 through page 12, line 22. Contrary to the Examiner's position, the intermediate data is not "an input sequence of data elements representing encoded audio samples," as recited. Accordingly, Uramoto teaches away from the claimed invention. Thus, Uramoto does not teach or suggest decoding digital audio data by "preprocessing the input sequence of data elements to produce an array of sum data and an array of difference data …; producing a first sequence of output values using the array of sum data; producing a second sequence of output values using the array of difference data; and forming decoded audio signals from the first and second sequences of output values" as recited.

With regard to the decoding operation of Uramoto, the Examiner previously stated that Uramoto discloses a processing unit operable in a decoding application in which the processing unit is "in its same form as the processing unit disclosed in Fig. 5." More specifically, and in reference to Fig. 11, Uramoto states "[p]ostprocessing section 7 has the same configuration as that of Fig. 5 or 6" (page 12, line 24). Although Uramoto discloses a postprocessing section 7 (Fig. 11) that has the same configuration as preprocessing section 1 (Figs. 4 or 5), postprocessing section 7 does not "produce an array of sum data and an array of

difference data using selected data elements from the input sequence," where the input sequence is an "input sequence of data elements representing encoded audio samples," as claimed.

In reference to the postprocessing section 7 of the IDCT processor (Fig. 11) having the same configuration as the preprocessing section 1 of the DCT processor (Fig. 4), Uramoto states "input circuit 21 sequentially or alternately receives intermediate terms Mi (i = 0 to 3), Ni (i = 0 to 3) to apply a desired combination of the terms to adder/subtractors 22, 23 (or 26)" (page 12, lines 24-26). That is, the postprocessing section 7 operates on intermediate terms to generate output data xi that is either a sum of intermediate terms (Mi and Ni) or a difference of intermediate terms, based upon the value of the integer i (page 12, lines 17-22). However, postprocessing section 7 does not operate on selected data elements from the input sequence to generate sum and difference data, where the selected data elements represent encoded audio samples. In other words, although postprocessing section 7 does operate as preprocessing section 1 to generate sum or difference data, postprocessing unit 7 does not generate an array of sum data and an array of difference data using selected data elements from the input sequence, as claimed.

Specifically, Uramoto discloses that x2 = M2 + N2 = A·y0 - C·y2 - A·y4 + B·y6 + F·y1 - D·y3 + G·y[5] + E·y7 (page 11, expression 13 and page 12, lines 7-20). That is, the sum output data generated by Uramoto (i.e., x0, x1, x2, x3) is not comprised of "selected data elements from the input sequence," as claimed. Instead, Uramoto generates an output x2, for example, that comprises additions and subtractions of products of input data (y0, y1, y2, y3, y4, y5, y6, y7) and elements (A, B, C, D, E, F, G) of a coefficient matrix (expression 13, page 11).

The Examiner's position appears to be that Uramoto **could** be further modified to achieve the claimed invention. The mere fact that references could be further modified is insufficient to establish obviousness, and the Examiner cites no motivation for this proposed further modification other than alleged skill in the art. Moreover, if the combination were further modified as the Examiner appears to suggest, the combination would not operate in accordance with the principles of operation of the decoder of Uramoto, which teaches an IDCT for decoding. Claims 2-6, 18 and 19 depend from claim 1. Thus, Uramoto cannot be considered to render the subject matter of claims 1-6, 11, 18 and 19 obvious.

Accordingly, Uramoto does not teach, suggest, or motivate, nor has the Examiner shown, decoding using "selected data elements from the input sequence" to generate either an array of sum data or an array of difference data, as claimed. Based at least upon the above arguments, claims 1-6, 11, 18 and 19 are not obvious over Uramoto.

2. Claims 7, 12 and 13 are not obvious over Uramoto in view of ISO Standard 11172-3

The Examiner rejected claims 7, 12 and 13 under 35 U.S.C. § 103(a) as obvious over Uramoto in view of ISO Standard 11172-3. The Examiner has failed to establish a *prima facie* case of obviousness.

As an initial matter, ISO Standard 11172-3 does not remedy the deficiencies of Uramoto as discussed above in conjunction with claims 1 and 11. ISO Standard 11172-3 does not teach, suggest or motivate "[a] method of **decoding** digital audio data, comprising the steps of ... preprocessing the input sequence of data elements to produce an array of sum data and an array of difference data **using selected data elements from the input sequence**," as recited in claim 1, or "[a] synthesis sub-band filter for use in **decoding** digital audio data, comprising ... pre-processing means for producing an array of sum data and an array of difference data **using selected data elements from the input sequence** ..." as recited in claim 11. Claim 7 depends from claim 1 and claims 12 and 13 depend from claim 11.

The Examiner again points to the description of Figure 5 of Uramoto, which describes an **encoder**. As discussed above, Uramoto teaches away from the claimed invention by describing the use of a difference method of decoding. See, *e.g.*, the description of Figure 11 of Uramoto. Further, one would not be motivated to combine the inverse modified discrete cosine transform (IMDCT) with Uramoto, which as discussed above teaches the DCT for encoding and IDCT for decoding. Accordingly, claims 7, 12 and 13 are not rendered obvious by Uramoto, alone or in combination with ISO Standard 11172-3.

3. Claims 8-10 and 20 are not obvious over Uramoto in view of ISO Standard 11172-3

The Examiner rejected claims 8-10 and 20 under 35 U.S.C. § 103(a) as obvious over Uramoto in view of ISO Standard 11172-3. The Examiner has failed to establish a *prima facie* case of obviousness.

As an initial matter, ISO Standard 11172-3 does not remedy the deficiencies of Uramoto as discussed above in conjunction with claims 1 and 11. Specifically, ISO Standard 11172-3 does not teach, suggest or motivate "[a] method of decoding...input digital audio data samples ... comprising the steps of: ... producing an array of sum data ... [;] producing an array of difference data ... [;] producing a first output audio data sample by a multiply-accumulate operation," as recited in claim 8.

The Examiner again points to the description of Figure 5 of Uramoto, which describes an **encoder**. As discussed above, Uramoto teaches away from the claimed invention by describing the use of a difference method of decoding. See, *e.g.*, the description of Figure 11 of Uramoto. Further, one would not be motivated to combine the inverse modified discrete cosine transform (IMDCT) with Uramoto, which as discussed above teaches the DCT for encoding and IDCT for decoding. Further, the sum output data xi = MI + Ni for I = 0, 1, 2, 3 and the difference output data xi = Mi – Ni for i = 4, 5, 6, 7 generated by postprocessing section 7 (Uramoto, page 12, lines 20-22 and Fig. 11) is not the same as the array of sum data $S_{ADD}[k]$ = S[k] + S[m-1-k] and the array of difference data $S_{SUB}[k]$ = S[k] – S(m-1-k) (for k = 0, 1 ...(m/2-1)), as claimed in claim 8. Uramoto discloses Mi to be an intermediate term comprised of additions and/or subtractions of products of input data (y0, y2, y4, y6) with coefficients A, B, C, and Ni to be an intermediate term comprised of additions and/or subtractions of products of input data (y1, y3, y5, y7) with coefficients D, E, F and G (page 11, expression 13 to page 12, line 22). In contrast, S[k] and S[m –1 – k] are coded input digital audio data samples. In other words, it is clear that xi = Mi. Ni does not equal either $S_{ADD}[k]$ or $S_{SUB}[k]$, since S[k] does not equal Mi and S[m-1-k] does not equal Ni.

Claims 9, 10 and 20 depend from claim 8. Accordingly, claims 8-10 and 20 are not rendered obvious by Uramoto, alone or in combination with ISO Standard 11172-3.

4. Claims 14-17 are not obvious over Uramoto in view of ISO Standard 11172-3

The Examiner rejected claims 14-17 under 35 U.S.C. § 103(a) as obvious over Uramoto in view of ISO Standard 11172-3. The Examiner has failed to establish a *prima facie* case of obviousness.

As an initial matter, ISO Standard 11172-3 does not remedy the deficiencies of Uramoto as discussed above in conjunction with claims 1 and 11. Specifically, ISO Standard 11172-3 does not teach, suggest or motivate "[an] MPEG decoder comprising ... means for producing an array of sum data and an array of difference data using selected data elements from the input sequence." The Examiner again points to the description of Figure 5 of Uramoto, which describes an **encoder**. As discussed above, Uramoto teaches away from the claimed invention by describing the use of a difference method of decoding. See, *e.g.*, the description of Figure 11 of Uramoto. Further, one would not be motivated to combine the inverse modified discrete cosine transform (IMDCT) with Uramoto, which as discussed above teaches the DCT for encoding and IDCT for decoding. Claims 15-17 depend from claim 14. Accordingly, claims 14-17 are not rendered obvious by Uramoto, alone or in combination with ISO Standard 11172-3.

VIII. CLAIMS APPENDIX

1. A method of decoding digital audio data, comprising the steps of:

obtaining an input sequence of data elements representing encoded audio samples;

preprocessing the input sequence of data elements to produce an array of sum data and an array of difference data using selected data elements from the input sequence;

producing a first sequence of output values using the array of sum data;

producing a second sequence of output values using the array of difference data; and

forming decoded audio signals from the first and second sequences of output values.

2. A method as claimed in claim 1 wherein the array of sum data is obtained by adding together respective first and second data elements from the input sequence, the first and second data elements being selected from mutually exclusive sub-sequences of the input sequence.

3. A method as claimed in claim 1 wherein the array of difference data is obtained by subtracting respective first data elements from corresponding second data elements of the input sequence, the first and second data elements being selected from mutually exclusive sub-sequences of the input sequence.

4. A method as claimed in claim 1 wherein the step of preprocessing the input sequence of data elements to produce an array of sum data and an array of difference data comprises:

dividing the input data sequence into first and second equal sized sub-sequences, the first sub-sequence comprising the high order data elements of the input sequence and the second sub-sequence comprising the low order data elements of the input sequence;

producing the array of sum data by adding together each respective data element of the first sub-sequence with a respective corresponding data element of the second sub-sequence; and

producing the array of difference data by subtracting each respective data element of the first sub-sequence from a respective corresponding data element of the second sub-sequence.

5. A method as claimed in claim 1 wherein the step of producing a first sequence of output values comprises performing a multiply-accumulate operation utilizing each of the sum data elements.

6. A method as claimed in claim 1, wherein the step of producing a second sequence of output values comprises performing a multiply-accumulate operation utilizing each of the difference data elements.

7. A method as claimed in claim 1 wherein the input sequence of data elements is derived from MPEG encoded audio data, and wherein the decoded audio signals comprise pulse code modulation samples.

8. A method of decoding a sequence of m, m an even positive integer, input digital audio data samples S[k], where k = 0, 1, ... (m-1), to produce a set of n, n an even positive integer, output audio data samples V[i], where i = 0, 1, ...(n-1), comprising the steps of:

a) producing an array of sum data $S_{ADD}[k]$ according to

$$S_{ADD}[k] = S[k] + S[m-1-k] \qquad \text{for } k = 0, 1, \ldots(m/2-1)$$

b) producing an array of difference data $S_{SUB}[k]$ according to

$$S_{SUB}[k] = S[k] - S(m-1-k) \qquad \text{for } k = 0, 1, \ldots(m/2-1)$$

c) producing a first output audio data sample by a multiply-accumulate operation according to

$$V[2i] = V[2i] + N[i, k]*S_{ADD}[k] \qquad \text{for } k = 0, 1, \ldots (m/2-1)$$

$$\text{where } N[i, k] = \cos\left[\frac{(32+2i)(2k+1)\pi}{64}\right]$$

d) producing a second output audio data sample by a multiply-accumulate operation according to

$$V[2i+1] = V[2i+1] + N[i, k]*S_{SUB}[k] \qquad \text{for } k = 0, 1, \ldots (m/2-1)$$

$$\text{Where } N[1, k] = \cos\left[\frac{(32+(2i+1))(2k+1)\pi}{64}\right]$$

e) and repeating steps c) and d) for i = 0, 1, ... (n/2-1) to produce a full set of output data.

9. A method as claimed in claim 8, wherein the number m of input digital audio data samples is 32, and the number n of output audio data samples is 32.

10. A method as claimed in claim 8 wherein the decoding steps are repeated for decoding a series of frames of encoded audio data in an MPEG format.

11. A synthesis sub-band filter for use in decoding digital audio data, comprising:

means for receiving or retrieving an input sequence of data elements comprising encoded digital audio data;

pre-processing means for producing an array of sum data and an array of difference data using selected data elements from the input sequence; and

transform output means for producing a first sequence of decoded output values using said array of sum data and a second sequence of decoded output values using said array of difference data.

12. A synthesis sub-band filter as claimed in claim 11 wherein the pre-processing means and transform output means collectively perform an inverse modified discrete cosine transform on the encoded digital audio data.

13. An MPEG decoder including a synthesis sub-band filter as claimed in claim 12.

14. An MPEG decoder comprising:

means for receiving an input sequence of data elements comprising encoded digital audio data;

means for producing an array of sum data and an array of difference data using selected data elements from the input sequence; and

means for producing a first sequence of decoded output values using said array of sum data and a second sequence of decoded output values using said array of difference data.

15. The MPEG decoder of claim 14 wherein the means for receiving an input sequence comprises a bitstream unpacking and decoding circuit.

16. The MPEG decoder of claim 14 wherein the means for producing an array of sum data and an array of difference data comprises a reconstruction circuit.

17. The MPEG decoder of claim 14 wherein the means for producing a first sequence of decoded output values comprises an inverse mapping circuit.

18. The method of claim 2 wherein the array of difference data is obtained by subtracting respective first data elements from corresponding second data elements of the input sequence, the first and second data elements being selected from mutually exclusive sub-sequences of the input sequence.

19. The method of claim 5 wherein the step of producing a second sequence of output values comprises performing a multiply-accumulate operation utilizing each of the difference data elements.

20. The method of claim 9 wherein the decoding steps are repeated for decoding a series of frames of encoded audio data in an MPEG format.

IX. EVIDENCE APPENDIX

None.

X. RELATED PROCEEDINGS APPENDIX

None.

Respectfully submitted,

Seed Intellectual Property Law Group PLLC

Timothy L. Boller
Registration No. 47,435

TLB:jl

701 Fifth Avenue, Suite 5400
Seattle, Washington 98104-7092
Phone: (206) 622-4900
Fax: (206) 682-6031

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